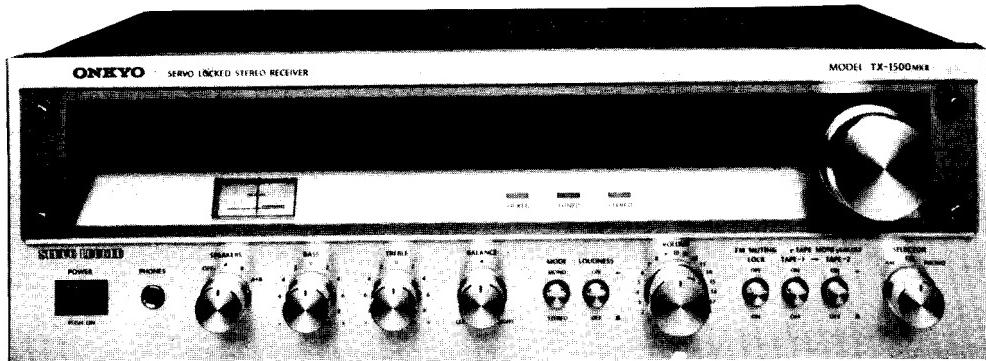


# ONKYO® SERVICE MANUAL

## SERVO LOCKED STEREO RECEIVER MODEL TX-1500MKII



**ONKYO®**  
**AUDIO COMPONENTS**

## SPECIFICATIONS

### Amplifier section

#### Power Output

17 watts per channel, min. RMS, at 8 ohms both channels driven, from 20 Hz to 20 kHz, with no more than 0.3% total harmonic distortion.  
20 watts per channel, min. RMS, at 8 ohms both channels driven, 1 kHz, 0.3% total harmonic distortion.

#### Total harmonic distortion

0.3% at rated power

#### IM Distortion

0.1% at 1 watt output

#### Damping Factor

30 at 8 ohms

#### Frequency Response

20 – 20,000 Hz ( $\pm 1$  dB)

#### Sensitivity and Impedance

PHONO: 2.5 mV 50 kohms  
TAPE PLAY: 150 mV 50 kohms  
TAPE REC: 150 mV 3 kohms (PHONO)

#### Phono Overload

100 mV RMS at 1 kHz 0.3% THD.

#### Tone Control Bass Treble

$\pm 12$  dB at 100 Hz

$\pm 10$  dB at 10 kHz

#### Signal to Noise ratio

PHONO: 65 dB (IHF C network)  
85 dB (IHF A network,  
10mV input)  
TAPE: 90 dB (IHF C network)  
95 dB (IHF A network)

$\pm 0.8$  dB 30 Hz – 15 kHz

+9 dB at 40 Hz

+6 dB at 20 kHz

### Tuner section

#### Tuning Range

FM: 88–108 MHz

AM: 530–1605 kHz

#### Usable Sensitivity

FM mono: 12.4 dBf, 2.3  $\mu$ V

FM stereo: 19.2 dBf, 5  $\mu$ V

AM: 25  $\mu$ V

#### 50 dB Quieting

Sensitivity

#### Intermediate Frequency

Capture Ratio

#### Image Rejection ratio

#### IF Rejection ratio

#### Signal to Noise ratio

#### Alternate Channel Att.

#### AM Suppression ratio

#### Harmonic Distortion

#### Frequency Response

#### Stereo Separation

#### Muting Level

#### Stereo Threshold

#### Servo Lock Lamp Level

#### Spurious Rejection

#### Sub Carrier

Suppression

#### Tuning Meter

### General

#### Power Supply Rating

#### Dimensions

#### Weight

FM mono: 18.3 dBf, 4.5  $\mu$ V

FM stereo: 39.2 dBf, 50  $\mu$ V

FM: 10.7 MHz

AM: 455 kHz

FM: 1.5 dB

FM: 45 dB

AM: 40 dB

FM: 80 dB

AM: 30 dB

FM mono: 65 dB

FM stereo: 60 dB

AM: 40 dB

FM: 60 dB

FM: 50 dB

FM mono: 0.25%

AM: 0.9%

FM: 30–15,000 Hz  $\pm 1.5$  dB

FM: 35 dB at 1 kHz

30 dB 100–10,000 Hz

FM: 3  $\mu$ V, 14.7 dBf

FM: 3  $\mu$ V, 14.7 dBf

FM: 3  $\mu$ V, 14.7 dBf

FM 1/2 IF: 78 dB

FM: 40 dB

Signal strength meter

#### AC 120 V 60 Hz

438(W) x 147(H) x 315(D) mm

17-1/4" x 5-13/16" x 12-3/8"

7.3 kg. (16.1 lbs.)

Specifications and features are subject to change without notice.

## PRECAUTIONS

- FOR CONTINUED PROTECTION AGAINST FIRE HAZARD, REPLACE ONLY WITH SAME TYPE AND SAME RATING FUSE.

DESCRIPTION	PARTS NO.	SPECIFICATIONS
AC FUSE	252044	2A (ST-6) UL
SPEAKER PROTECTION FUSE	252025	2.5A-T

- Always disconnect the chassis from power line cord when soldering.

Turning the power switch OFF is not enough.

Power line leakage passing through the heating element may destroy the transistors.

## SERVICE PROCEDURES

### 1. REMOVAL OF THE FRONT PANEL

- 1) Remove four screws holding the ampli. cover and side bracket.
- 2) Remove two screws holding the ampli. cover and back panel.
- 3) Pull out the control knobs.
- 4) Remove four screws holding the front panel and the front bracket.

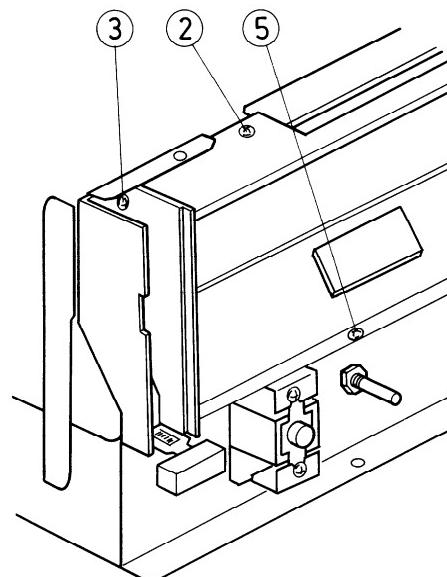
### 2. REMOVAL OF THE DIAL GLASS

Remove four screws holding the dial glass and the front panel.

NOTE: The dial glass has been mounted by applying an 800 gr torque to the screws. If the dial is removed during repairs, and a torque driver is available, apply 800 gr torque to the screws when replacing. If however, torque driver is not available, simply tighten the screws by hand. When replacing the dial glass, insert all relevant component parts in accordance with the cross sectional diagram.

### 3. REPLACING THE METER

- 1) Remove the top cover and front panel.
- 2) Remove the two screws securing the illumination bracket and front bracket.
- 3) Remove the two sets of screws securing the left and right dial plate frame and front bracket.
- 4) Remove the dial plate from the drive shaft.
- 5) Remove the three screws securing the front bracket and back plate.
- 6) The top and bottom side of the meter cover are fastened to the back plate by adhesive tape. Remove this tape, taking care not to jar knock the meters.

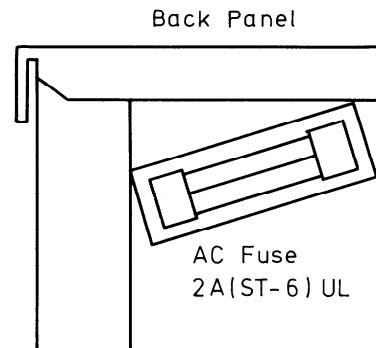


### 4. SENSOR SWITCH

For matching the automatic FM tuning servo locked system to the various operating conditions. Set to LOW initially and switch to HIGH if the TUNED lamp does not turn off as soon as the tuning knob is touched.

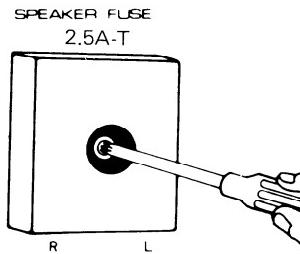
### 5. REPLACING THE AC FUSE

- 1) Remove the bottom board.
- 2) Replace the AC fuse with same type and same rating fuse.



### 6. REPLACING THE SPEAKER PROTECTION FUSE

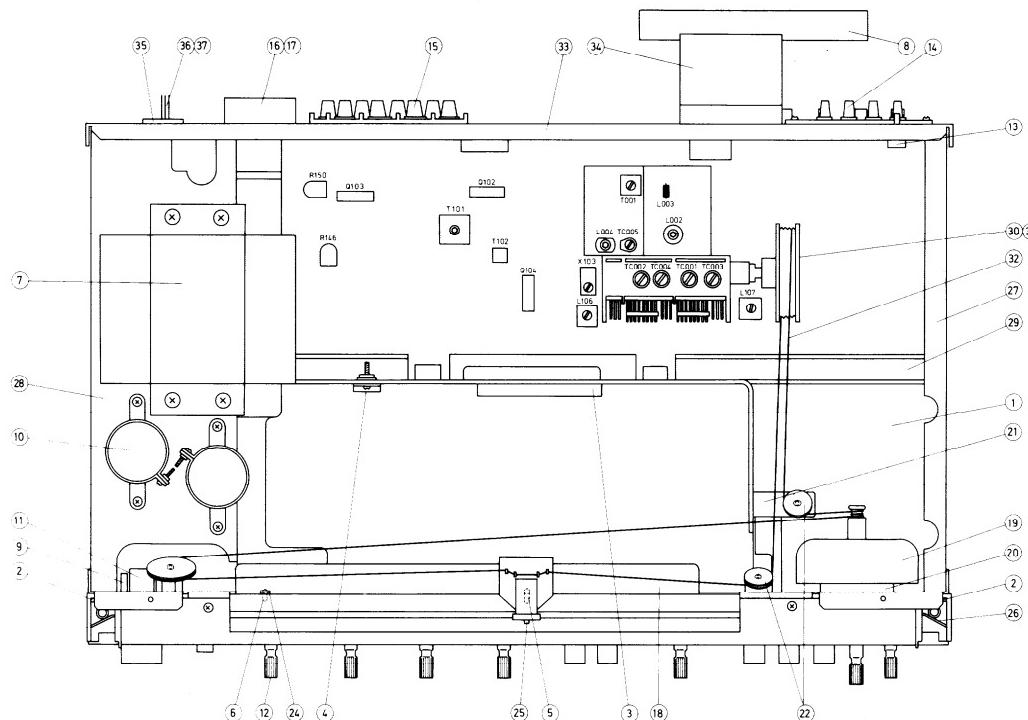
- 1) Remove a screw holding the cover and back panel and the cover.
- 2) Replace the fuse with same type and same rating fuse.



### 7. REPLACING THE INDICATOR LAMPS

All indicator lamps are linked to their respective lamp covers. So when replacing remove the defective lamp from the front bracket with its cover in place.

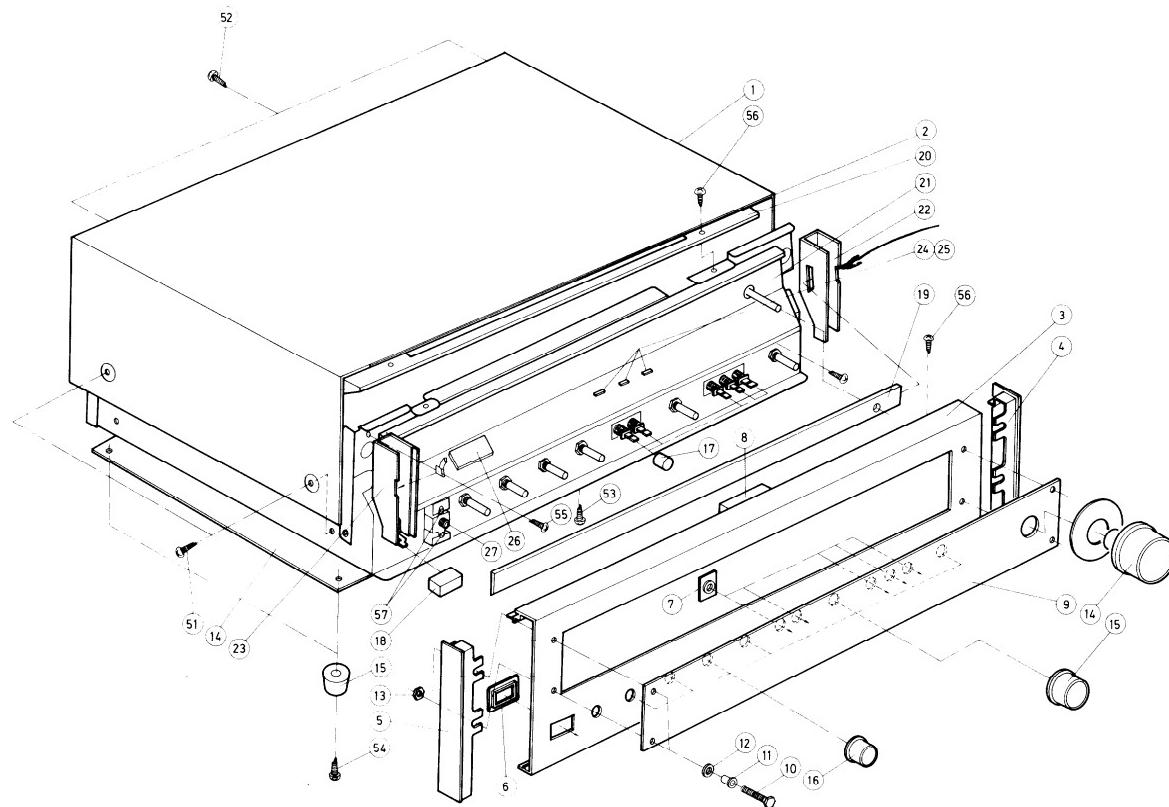
## **COMPONENT LOCATION**



## **COMPONENT LOCATION – PARTS LIST**

REF. NO.	CIRCUIT NO.	PARTS NO.	DESCRIPTION
1.	U1	13679507	NAAR-507, Tuner and ampli. p.c.b.
2.	U2	13719574	NAPL-474, Dial illumination p.c.b.
3.	Q501	222016	STK-459, Power ampli. IC
4.	Q901	2200113 or 2200020	2SD234(O) or (Y), Lipple filter transistor
5.	PL801	210044	PL8V 0.05AW-3, Pointer lamp
6.	PL802	210041	PL8V0.15AW-2, Meter illumination lamp
7.	T901	230251	NPT-644D, Power transformer
8.	L105	232063	NMA-1008, AM bar antenna
9.	L105	232067	NMA-1011, AM bar antenna
10.	C901	3504012	0.01µF, 125V, UL capacitor
11.	C902, C903	3504081	4.700µF, 35V, Elect. capacitor
12.	S901	25035047	NPS-111-L12P, Power switch
13.	S809	25030074	NRS-144-30Y, Speaker selector switch
14.	S807	250142	NSS-2225, Hum sensor switch
15.	P805	25060035	NTM-4PRMC06, Antenna terminal
16.	P806, P807	25060026	NTM-4PRMN03, Speaker terminal
17.	F501a, F601a	25050004	Fuse holder with cover
18.	F501, F601	252025	2.5A-T, Speaker protection fuse
19.	A001	27110062	Front bracket
20.	A002	27205014	Drive shaft
21.	A003	27300071	Bearing
22.	A004	27140218	Bracket for dial pulley
23.	A006	27185002	DP-16N, Dial pulley
24.	A005	27185001	DP-26N, Dial pulley
25.	A008	27300114	Lamp cover
26.		13679701	Pointer
27.	A018	27140203	Spring
28.	A034	27115018B	Side bracket
29.	A035	27130104A	Bracket for power transformer
30.	A036	27160041A	Radiator
31.	A041	27200019	Dial drum
32.	A042	273803	SP-14A, Dial drum spring
33.	A043	273903	Stringing
34.	A048	27120124A	Back panel
35.	A049	27190024	Antenna holder
36.	P901	25050032	S-I6444-01, AC outlet
37.	W901	253099	AS-UC3, Power supply cord
		270025	SP-3P-4, Strainrelief
	F901a	250143	FF-1S4, Fuseholder
	F901	252044	2A(ST-6)UL, AC fuse

## EXPLODED VIEW



### EXPLODED VIEW – PARTS LIST

REF. NO.	PARTS NO.	DESCRIPTION
1.	28184042	Top cover
2.	28140024	Cushion
3.	13679121	Front panel ass'y
4.	28125052	End cap (R)
5.	28125053	End cap (L)
6.	27267030	Guide for power switch
7.	27267026	Guide for push switch
8.	28140105	Cushion
9.	28191028	Dial glass
10.	84334015	M4X15(Cr), Hexagone volt
11.	27270017A	Spacer
12.	870059	Washer
13.	863140	N-4F-N, Nut
14.	28320247	Tuning knob
15.	28320238	Volume control knob
16.	28320237	Tone control knob
17.	28320239	Push switch knob
18.	28320171A	Power switch knob
19.	28130068A	Dial Plate
20.	27240017A	Dial illumination bracket
21.	28133010	Back plate
22.	27215036	Dial frame (R)
23.	27215037	Dial frame (L)
24.	28198512	Facet
25.	210040A	PL12V0.03AW-3, LOCKED/TUNED/STEREO indicator lamp
26.	243090	NIND-0500S90, Signal strength meter
27.	25045018	LJ-100-H, Stereo headphone jack
28.	27170045	Bottom board
29.	27175009	T-C, Leg
51.	838440109	4TTB+10C(BC)
52.	834430102	3STS+10BQ(BC)
53.	831130062	3STW+6BQ
54.	831130122	3STW+12BQ
55.	831130082	3STW+8BQ
56.	834130062	3STS+6BQ
57.	801105	8W3P+6FN

## ALIGNMENT PROCEDURES

### INSTRUMENTS REQUIRED

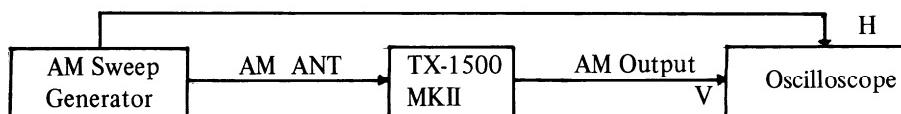
1. AM Sweep Generator
2. AM and FM Signal Generator
3. Vacuum Tube Voltage Meter (VTVM) AC, DC
4. Oscilloscope
5. Distortion Analyzer
6. Stereo Modulator
7. Frequency Counter

### GENERAL ALIGNMENT CONDITIONS

1. Signal input should be kept as low as possible.
2. Standard modulation is 400Hz 30% (AM), 1 kHz 100% (FM MONO) pilot 9% sub and main 91% (FM STEREO).
3. Standar knob position  
 SPEAKER . . . . . A  
 BASS, TREBLE & BALANCE . . . Center  
 MODE . . . . . Stereo  
 LOUDNESS, MUTING LOCK . . . OFF  
 TAPE 1, 2 . . . . . OFF (source)

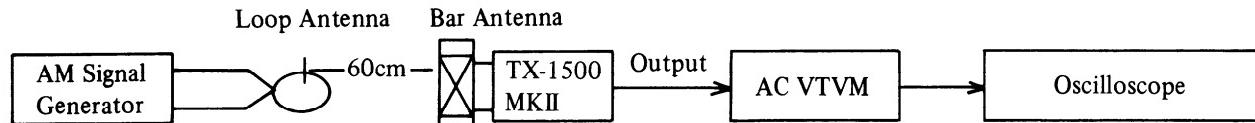
### (1) AM IF ALIGNMENT

1. Set SELECTOR switch to AM.
2. Set radio dial to quiet point.



Set signal	Adjust	Oscilloscope	Remarks
455 kHz	X103	Maximum Symmetrical Response	Usually not necessary to adjust

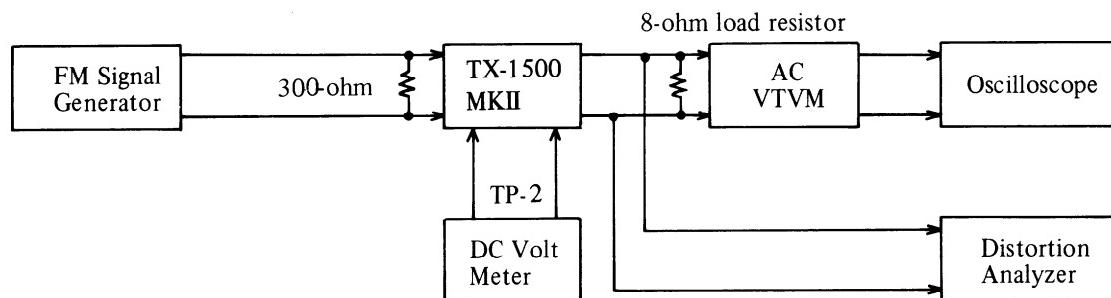
### (2) AM RF ALIGNMENT



Step	Set Signal	Set Radio Dial	Adjust	VTVM reading	Remarks
1	515 kHz 400 Hz 30 %	Lower end (515 kHz)	L106	Maximum	Repeat steps 1 and 2 as necessary
2	1680 kHz 400 Hz 30%	Upper end (1680 kHz)	TC002	Maximum	
3	600 kHz 400 Hz 30%	600 kHz	L105 or L107	Maximum	Adjust with L105 when L107 is not used. Repeat steps 3 and 4 as necessary
4	1400 kHz 400 Hz 30 %	1400 kHz	TC001	Maximum	

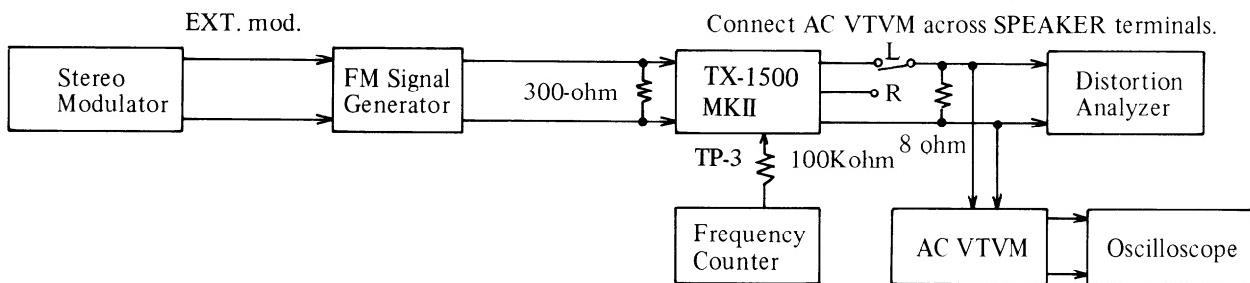
### (3) FM FRONT END ALIGNMENT

1. Set SELECTOR switch to FM.
2. Push MUTING switch to off.
3. Connect FM Signal Generator to 300-ohm antenna terminals.
4. Connect DC Voltmeter to TP-2 terminals.

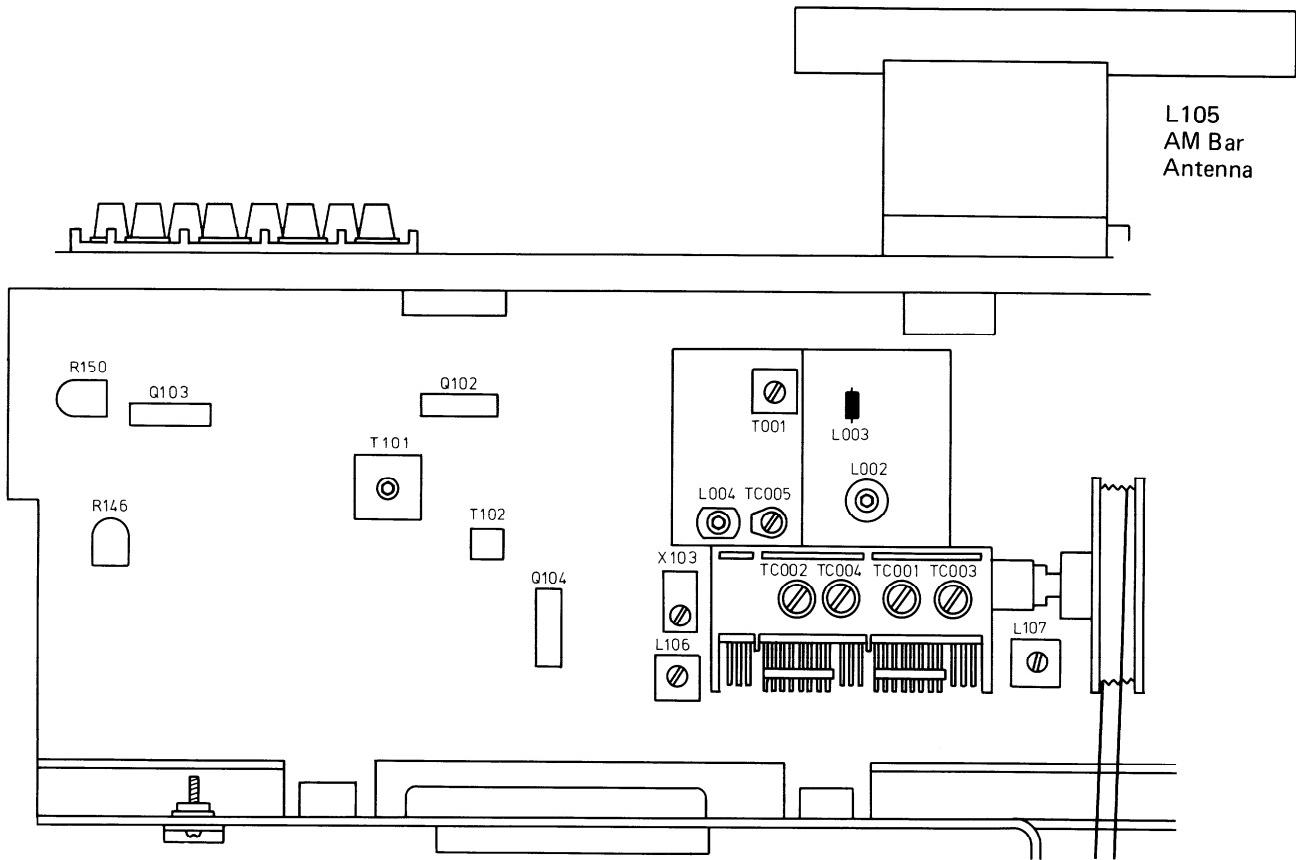


Step	FM Signal Generator	Dial to set	Adjust	Output Indicator	Adjust for	Remarks
1	No signal	Quiet Point	T101 Bottom	DC Voltmeter	0V	Repeat Steps 1 and 2 as necessary
2	98MHz 65dBf(60dB) 1kHz 75kHz devi.	98MHz	T101 Top	Distortion Analyzer	Minimum	
3	90MHz 65dBf(60dB) 1kHz 75kHz devi.	90MHz	L004	DC Voltmeter	0V	Repeat Steps 3 and 4 as necessary
4	106MHz 65dBf(60dB) 1kHz 75kHz devi.	106MHz	TC005			
5	90MHz 20dBf(15dB) 1kHz 75kHz devi.	90MHz	L001 L002	AC VTVM or Oscilloscope	Maximum	Repeat Steps 5 and 6 as necessary
6	106MHz 20dBf(15dB) 1kHz 75kHz devi.	106MHz	TC003 TC004		Maximum	
7	98MHz 65dBf(60dB) 1kHz 75kHz devi.	98MHz	T001	Distortion Analyzer	Minimum	

#### (4) MULTIPLEX ALIGNMENT

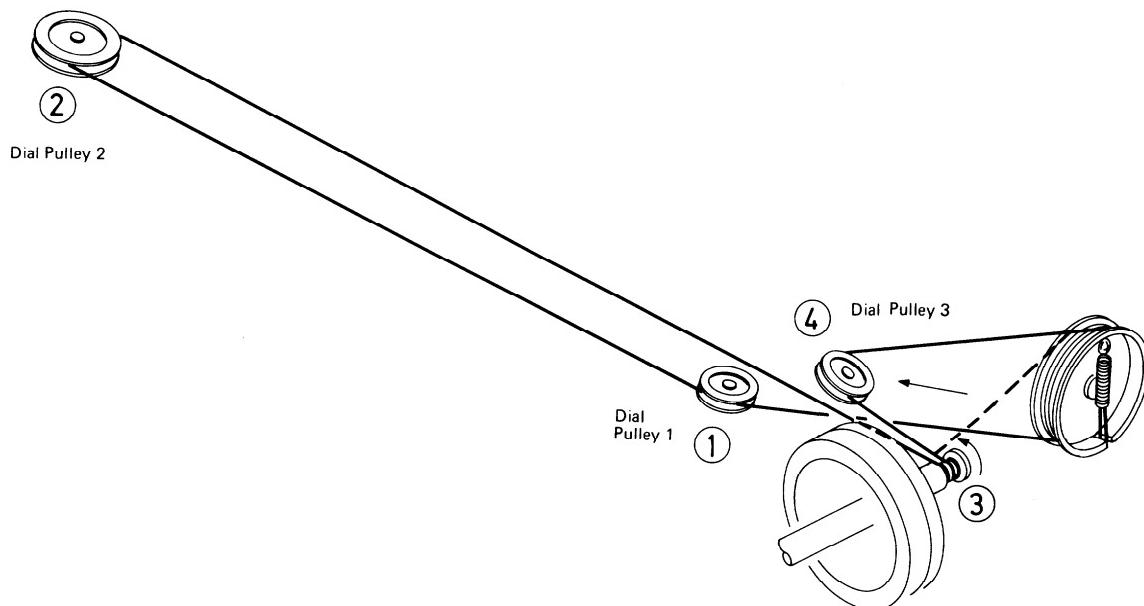


Alignment	Step	FM Signal Generator	Stereo Modulator	Dial to Set	Adjust	Output Indicator	Adjust for	Remark
V.C.O.	1	98 MHz no mod. 60 dBf (60dB)	—	98 MHz	R146	Frequency Counter	19000±19 Hz	
	2	STEREO INDICATOR should light up when stereo program is being received.						
Separation	1	98 MHz EXT. Mod. 65 dBf (60dB)	Pilot Sig. 9% Main & Sub Sig. 1 kHz Lch 91%	98 MHz	R150	AC VTVM Right ch.	Minimum	Repeat steps 1 & 2 as necessary
	2	Same as above	Pilot Sig. 9% Main & Sub Sig. 1 kHz Rch 91%	98 MHz	R150	AC VTVM Left ch.	Minimum	



## STRINGING DIAGRAM

1. Close the variable capacitor complete and tie the dial cord to the spring of the drum.
2. Thread the dial cord in the direction of arrow from (1) to (3) and wind the dial cord three turns around the tuning shaft clockwise.
3. Wind the dial cord  $1\frac{1}{2}$  turns around the dial drum.
4. Thread the dial cord to the dial pulley 3.



## PRINTED CIRCUIT BOARD (NAAR-507) – PARTS LIST

CIRCUIT NO.	PARTS NO.	DESCRIPTION	CIRCUIT NO.	PARTS NO.	DESCRIPTION
		<b>ICs</b>			<b>Capacitors</b>
Q102	222455	LA1230	VC001	3050004	NVC2-327SA, Variable
Q103	222449	LA3350	TC005	3060003	NTC-10P02, Trimmer
Q104	222497	LA1240	C106	352741001	10µF, 16V, Elect.
Q301, Q401	222451	TA7129P(ONK)	C107	352780331	3.3µF, 50V, Elect.
Q501	222016	STK-459	C110	352784791	0.47µF, 50V, Elect.
			C113	352741001	10µF, 16V, Elect.
		<b>Transistors</b>	C115	352721011	100µF, 6.3V, Elect.
Q001	2210374	2SK19GR(O-1)	C116	352780101	1µF, 50V, Elect.
Q002	2210380	2SC785(O-1)	C142	352741001	10µF, 16V, Elect.
Q003	2210393	2SC394(O)	C143	352780101	1µF, 50V, Elect.
Q101	2210123	2SC380(O) or 2SC380(Y) or	C145	372321525	1,500pF±10%, 50V, ST
Q105~Q108	2210943	2SC1317(R) or 2211182 or 2SC1740(Q) or	C146	392884797	0.47µF, 50V, LL
Q109	2210942	2SC1317(Q) or	C147	392882297	0.22µF, 50V, LL
Q109	2210244	2SC735(Y) or	C148	392883397	0.33µF, 50V, LL
Q201, Q202	2211184	2SC1740(S) or 2210086 2SC733(BL) or	C151, C152	392882297	0.22µF, 50V, LL
Q302, Q402	2210975	2SC1344(E) or 2210137 2SC132(G) or	C165	372323614	360pF±5%, 50V, ST
Q701, Q702	2211184	2SC1740(S) or 2210086 2SC733(BL) or	C168	352741001	10µF, 16V, Elect.
Q901	2200113	2SD234(O) or 2200020 2SD234(Y) or	C169	352741011	100µF, 16V, Elect.
Q902	2210747	2SC945A(Q1) or 2210744 2SC945L(Q) or	C171	374124737	0.047µF±20%, 50V, DE
			C172	352780331	3.3µF, 50V, Elect.
			C174	352780101	1µF, 50V, Elect.
			C201	352780101	1µF, 50V, Elect.
			C203	352761011	100µF, 35V, Elect.
			C205	352784791	0.47µF, 50V, Elect.
			C207	352734701	47µF, 10V, Eject.
			C208	352780101	1µF, 50V, Elect.
			C209	352732201	22µF, 10V, Elect.
		<b>Diodes</b>	C302, C402	352750471	4.7µF, 25V, Elect.
D001	223110	1S2687	C303, C403	352721011	100µF, 6.3V, Elect.
D101, D102			C308, C408	352784791	0.47µF, 50V, Elect.
D104, D105	223105	1S1555	C309, C409	392883397	0.33µF, 50V, LL
D108			C310	352762211	220µF, 35V, Elect.
D106	224011 or 223943	YZ-047 or RD4.7EB or	C332, C432	374124735	0.047µF±10%, 50V, DE
D107	4000022	VD1212	C333, C433	392880227	2.2µF, 50V, LL
D201, D202	223103	1N60	C335, C435	352742211	220µF, 16V, Elect.
D701, D905	223858	GP08D	C336, C436	352780331	3.3µF, 50V, Elect.
D906	223806 or 223806	1S1886 or 1S1886	C337, C437	392880107	1µF, 50V, LL
D702, D703	223106	1S1554	C501, C601	352733301	33µF, 10V, Elect.
D901~D904	223842	GP-15B	C502, C602	352784701	47µF, 50V, Elect.
D907	223915 or 223967	WZ-150 or RD15EB or	C503, C603	352761011	100µF, 35V, Elect.
			C504	352741011	100µF, 16V, Elect.
			C505, C605	352780331	3.3µF, 50V, Elect.
			C507	352780471	4.7µF, 50V, Elect.
		<b>Coils</b>	C701	352762211	220µF, 35V, Elwct.
L001	223106 or 233088	NFA-3009 or NFA-3001	C702	352762201	22µF, 35V, Elect.
L002	233103	NFRF-3005	C703	352784711	470µF, 50V, Elect.
L003	233037	NFT-1501	C904	352763311	330µF, 35V, Elect.
L004	233090	NFO-3003	C905	352741011	100µF, 16V, Elect.
L101	233105 or 233024	NCH-1005 or NCCH-1501	C906, C907	352784711	470µF, 50V, Elect.
L102	233074	NCCH-1506	R146	5225056	N10HR5KBC, Variable
L103, L104	233107 or 233021	NMC-5002 or NMC-8-5	R150	5225018	N10HR1KBC, Variable
L106	232073	NMO-2008	R336, R436	5148024	N16RGL250KBT30, Volume
L107	232057	NMA2523	R343	5104046	N16RL100KW30, Balance
			R344, R444	5148014	N16RGM100KB30, Treble
			R350, R450	5148014	N16RGM100KB30, Bass
		<b>Transformers</b>	R508	451623394	0.33Ω, 1W, Metal
T001	233085	NIT-0518	R608	451623394	0.33Ω, 1W, Metal
T101	233083 or 233101	NIT-3516 or NFIF-6003	R701	441721224	1.2kΩ, 2W, MOF
T102	232041	NIT-0509	R902	441621814	180Ω, 1W, MOF
			R903	441624714	470Ω, 1W, MOF
			R507		
		<b>Ceramic filters</b>			
X101, X102	3010003	SFE-10.7MA	S801	25030075	NRS-143-30ZV, Selector
X103	3010004	CFZ455C	S802	25035081	NPS-322-L46, TAPE
		<b>Switches</b>			

CIRCUIT NO.	PARTS NO.	DESCRIPTION
S805	25035080	NPS-222-L45, Selector
		<b>Terminals</b>
P801	25045041	NPJ-6RDBU8
P802	25045020	NPJ-4PDBL11
		<b>Relay</b>
RL101	25065026	L-13
		<b>Shielded case</b>
	27150056A	Front end
	27150057	Front end bottom

## **DIAL ILLUMINATION LAMP PC BOARD (NAPL-474) – PARTS LIST**

**CIRCUIT NO. PARTS NO. DESCRIPTION**  
210039A 300mA, 8V, Dial illumination lamp

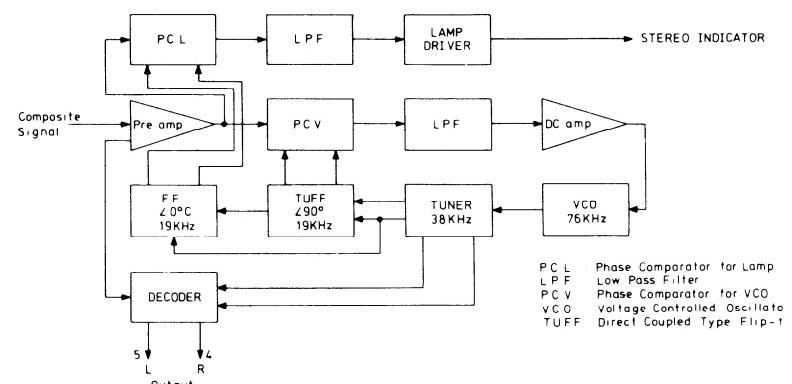
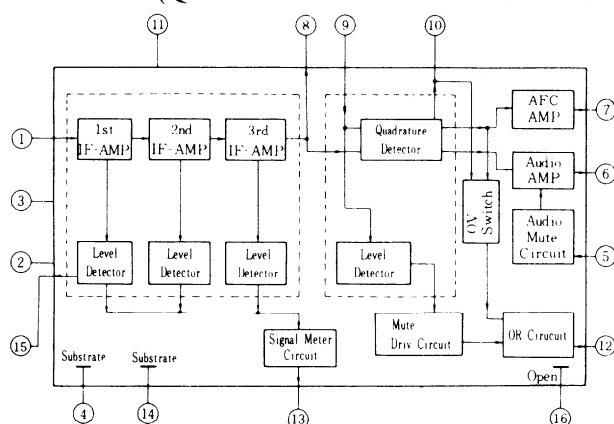
## NOTES:

1. Capacitors  
LL: Low leakage current type electrolytic capacitor  
DE: Non-inductive polyester film capacitor  
ST: Polystren film capacitor

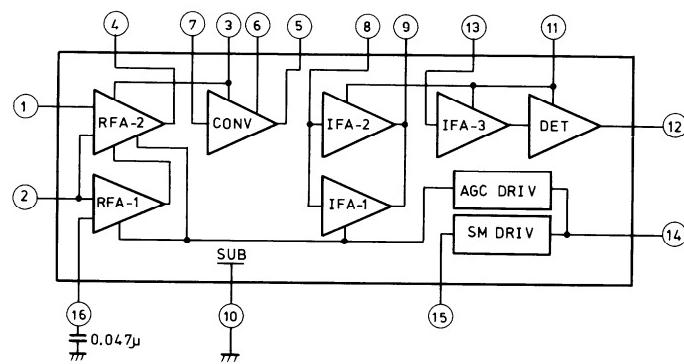
2. Resistors  
MOF: Metal oxide film resistor  
MO: Metal oxide resistor

## BLOCK DIAGRAM

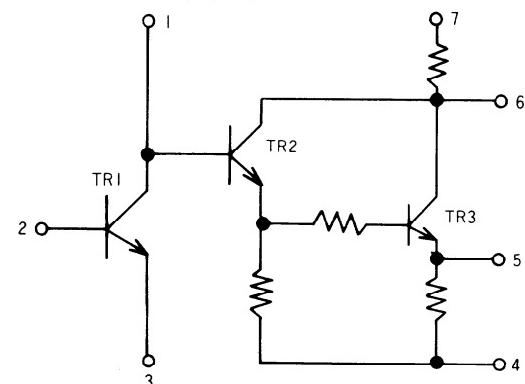
**LA1230 (QUADRATURE DETECTOR AND FM IF IC)      LA3350 (PLL MULTIPLEX DECODER IC)**



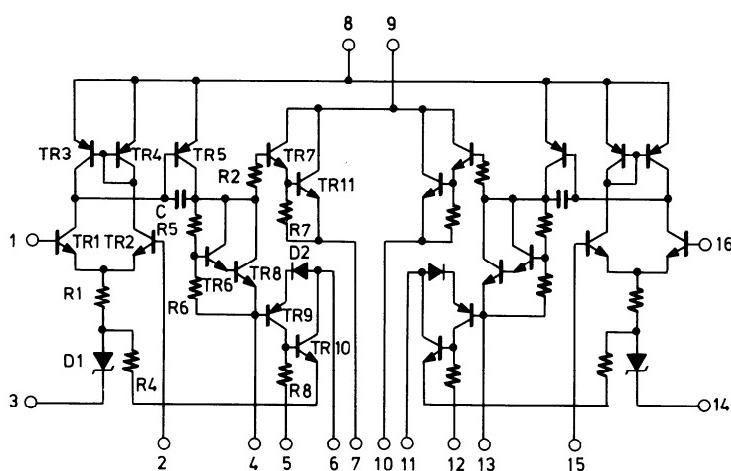
LA1240 (AM IC)



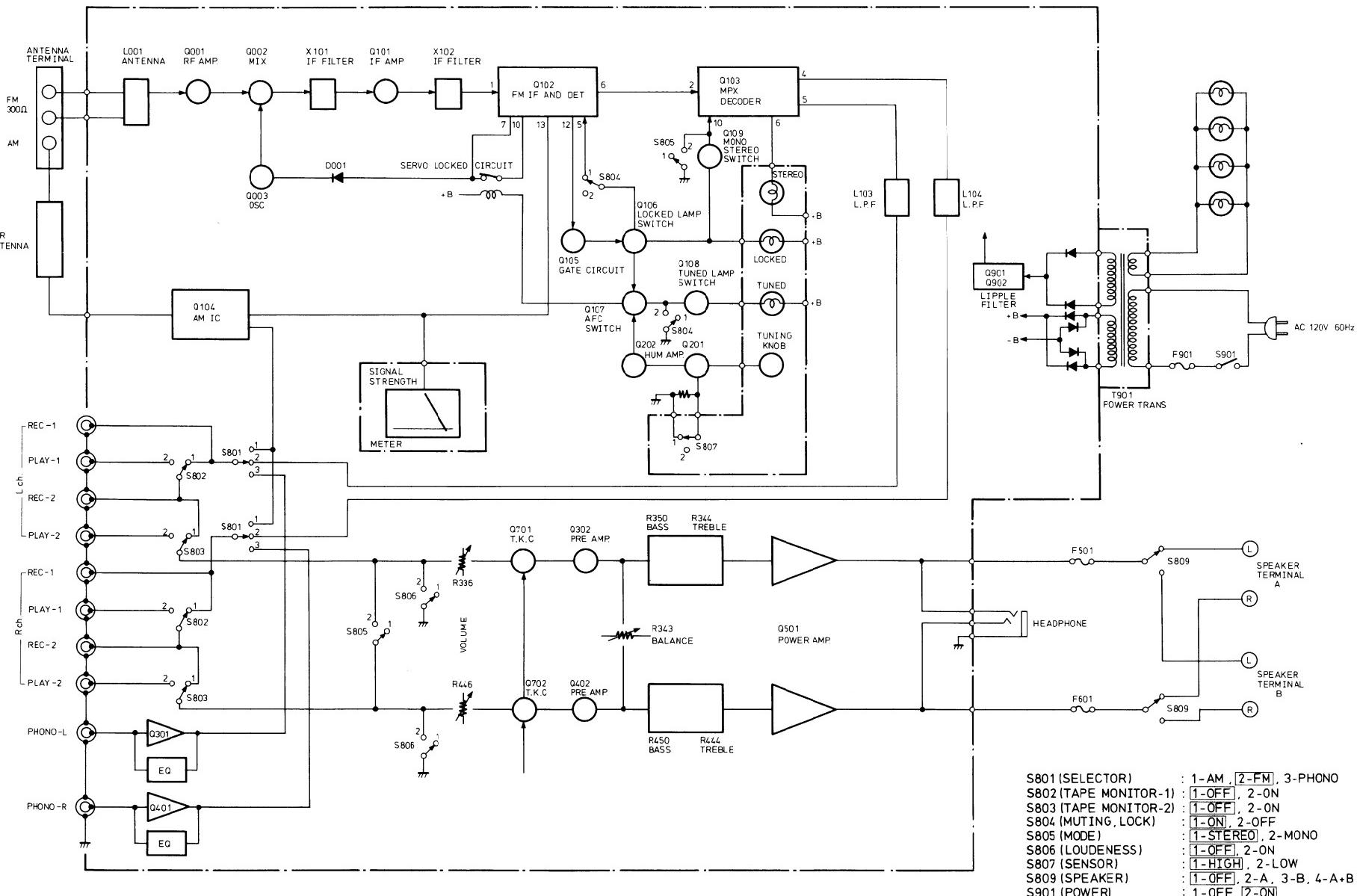
## TA-7129P (ONK) (EQUALIZER AMPLI. IC)



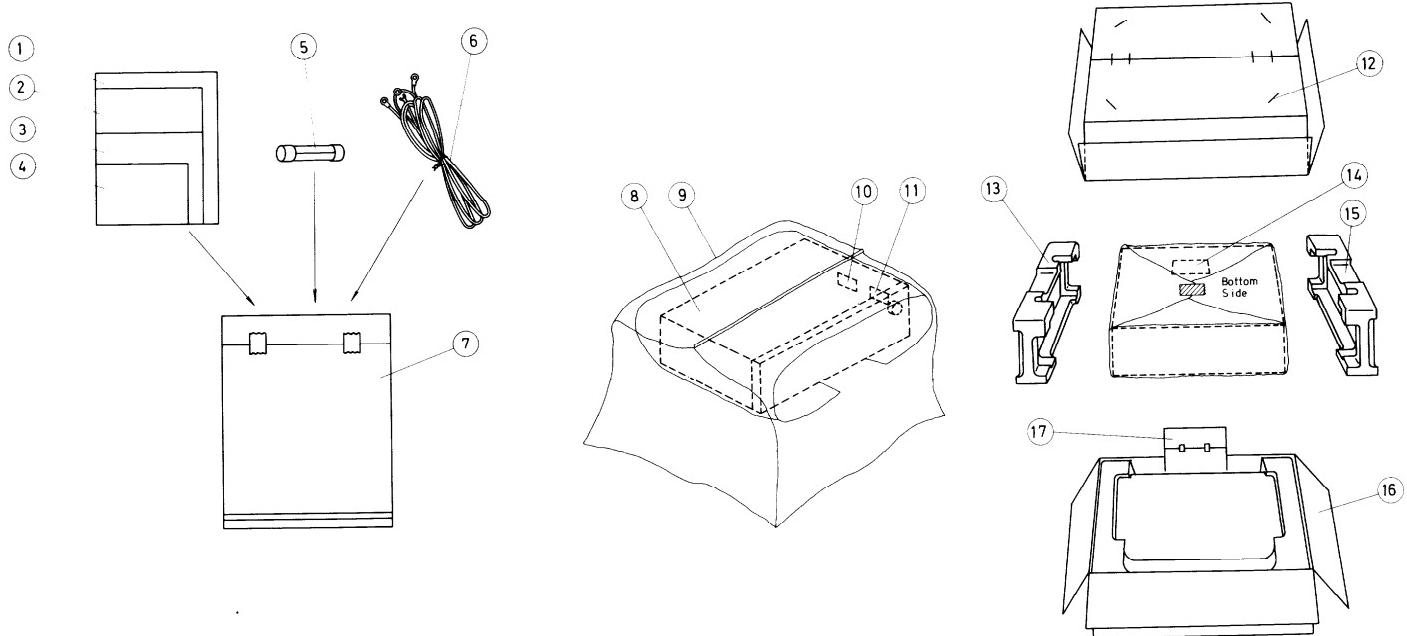
## STK-459 (POWER AMPLI. IC)



# BLOCK DIAGRAM



# PACKING PROCEDURES



## PACKING PROCEDURES – PARTS LIST

REF. NO.	PARTS NO.	DESCRIPTION
1.	29340276	Instruction manual
2.	29358001	Service station list
3.	29355046	Caution card for 4
4.	29365003	Warranty card
5.	252025	2.5 A-T, Fuse
6.	292064	FM antenna
7.	29100006	350 x 250mm, Poly bag
8.	29095026	330 x 900mm, Protection sheet
9.	29100018	650 x 750mm, Poly bag
10.	282969	Caution card A
11.	29360197	Cabinet composite label
12.	282301	Sealing hook
13.	29090187	Pad (R)
14.	293041	Caution label
15.	29090188	Pad (L)
16.	29050198	Carton box
17.	13679119	Accessory bag

### ONKYO CORPORATION

International Division: No. 24 Mori Bldg., 23-5, 3-chome, Nishi-Shinbashi, Minato-ku, Tokyo, Japan  
Telex: 2423551 ONKYO J. Phone: 03-432-6981

### ONKYO U.S.A. CORPORATION

Eastern Office  
42-07 20th Avenue, Long Island City, New York 11105, U.S.A. Phone: (212) 728-4639

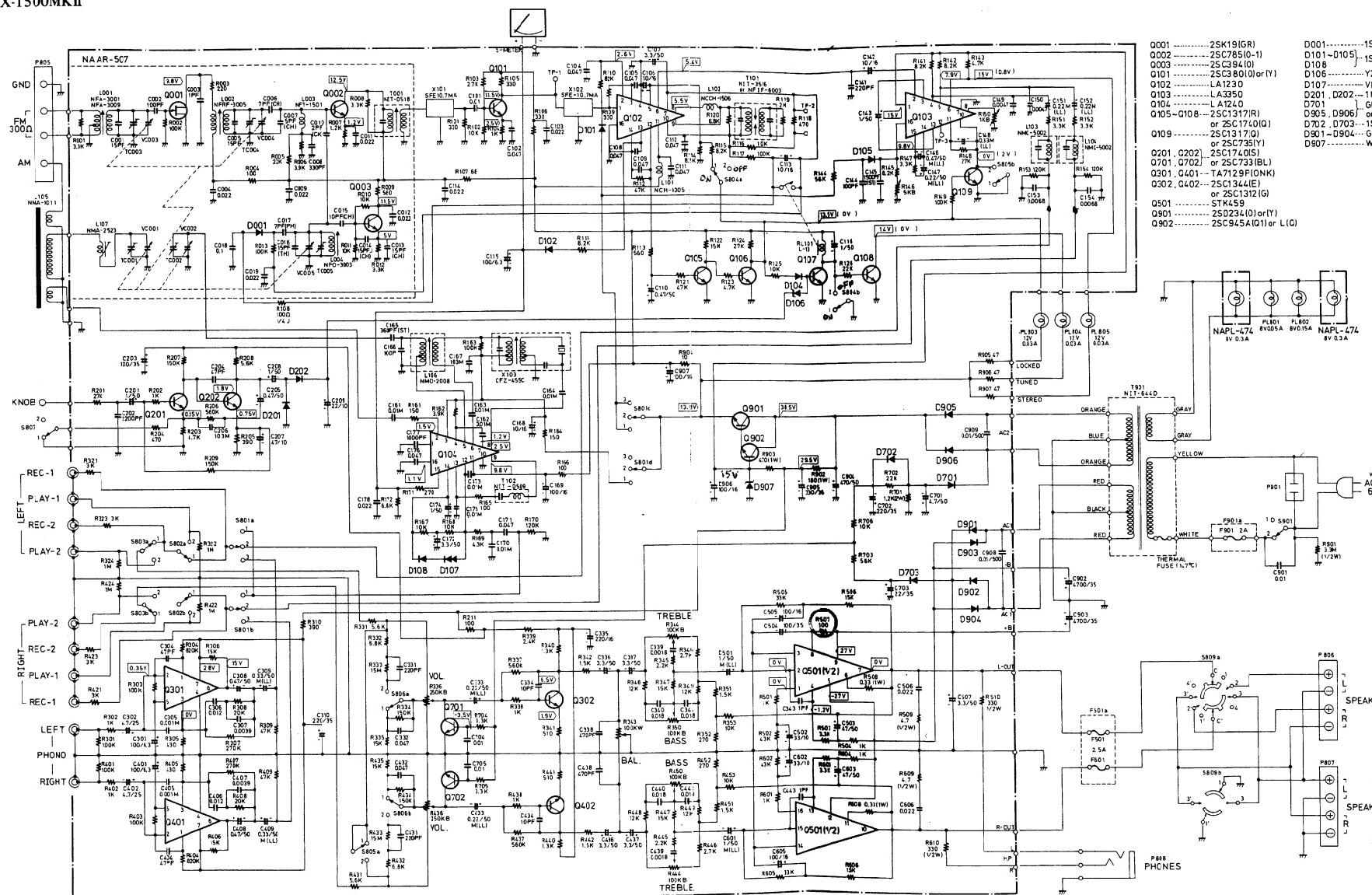
Midwest Office  
935 Sivert Drive, Wooddale, Illinois 60191, U.S.A. Phone: (312) 595-2970

### ONKYO DEUTSCHLAND GMBH, ELECTRONICS

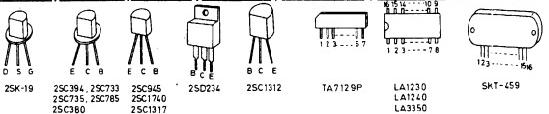
8034 München-Germering, Industriestrasse 18, West Germany. Telex: 521726 Telefon: (089)-84-5041

## **SCHEMATIC DIAGRAM**

## **MODEL TX-1500MKII**



S801 (SELECTOR)	1-AM, [2-FM], 3-PHONO
S802 (TAPE MONITOR-1)	1-[OFF], 2-ON
S803 (TAPE MONITOR-2)	1-[OFF], 2-ON
S804 (MU <sup>ING</sup> , LOCK)	1-ON, 2-OFF
S805 (MODE)	1-Stereo, 2-MONO
S806 (LOUDNESS)	1-[OFF], 2-ON
S807 (SENSOR)	1-HIGH, 2-LOW
S809 (SPEAKER)	1-[OFF], 2-A, 3-B, 4-A+B
S901 (POWER)	1-[OFF], 2-ON



NOTE  
 • ALL RESISTORS ARE IN OHMS, 1/4 WATT UNLESS OTHERWISE NOTED.  
 • ALL CAPACITORS ARE IN  $\mu$ F. 50WV UNLESS OTHERWISE NOTED.  
 • ELECTROLYTIC CAPACITORS (1-12) ARE IN  $\mu$ F/WV.  
 • VOLTAGE (MEASURED WITH V.T.V.M.)  
 ( ) DC VOLTAGE (NO INPUT SIGNAL).  
 ( ) DC VOLTAGE (FM STEREO).

**ONKYO CORPORATION**